Name: Date:

Polynomial Factoring solution (version 645)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 - 12x + 38 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(38)}}{2(1)}$$

$$x = \frac{-(-12) \pm \sqrt{144 - 152}}{2(1)}$$

$$x = \frac{12 \pm \sqrt{-8}}{2}$$

$$x = \frac{12 \pm \sqrt{-4 \cdot 2}}{2}$$

$$x = \frac{12 \pm 2\sqrt{2}\, i}{2}$$

$$x = 6 \pm \sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-8 - 2i$ and $5 - 3i$ in standard form $(a + bi)$.**

Solution

$$(-8 - 2i) \cdot (5 - 3i)$$
$$-40 + 24i - 10i + 6i^2$$
$$-40 + 24i - 10i - 6$$
$$-40 - 6 + 24i - 10i$$
$$-46 + 14i$$

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3. **Write function $f(x) = x^3 + 4x^2 - 27x - 90$ in factored form. I'll give you a hint: one factor is $(x + 6)$.**

Solution

	1	4	-27	-90
-6		-6	12	90
	1	-2	-15	0

$$f(x) = (x + 6)(x^2 - 2x - 15)$$

$$f(x) = (x + 6)(x - 5)(x + 3)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x + 6)^2 \cdot (x + 2)^2 \cdot (x - 1)^2 \cdot (x - 5)$$

Sketch a graph of polynomial $y = p(x)$.